**Influence of Fe-Doping on Structural and Magnetic Properties of ZnO Nanoparticles Prepared by Sol-gel Co-precipitation Method**

Raminder Preet Pal Singh1, Pushpendra Kumar2, Shailja Sharma3

1Department of Electronics & Ccommunication Engineering, Arni University, Kangra, Himachal Pradesh, India

2Department of Chemistry, Arni University, Kangra, Himachal Pradesh, India

Dept. of Chemistry, Dayalbagh Educational Institute, Agra

**ABSTRACT**

Fe-doped ZnO semiconductor is a promising candidate for Spintronic based device applications. In this work, we have synthesized Zn1-xFexO (x=0.01, 0.03 and 0.05) nanoparticles and studied the effect of increasing Fe concentration on Structural and Magnetic properties of ZnO diluted magnetic semiconductor (DMS). Bulk samples were synthesized using sol-gel co-precipitation method. X-ray diffraction and VSM (Vibrating Sample Magnetometer) were used to study crystalline phases and Magnetic properties of samples. The average crystalline size was determined on the basis of Debye-Scherrer’s equation. X-ray diffraction patterns revealed that the crystal structure of samples corresponds to hexagonal wurtzite ZnO phase along with some traces of ZnFe2O3 and Fe metal. Magnetization curve showed ferromagnetism behavior at room temperature with 1% Fe concentration. At higher concentration (3% and 5 %), ferromagnetism behavior was suppressed and paramagnetic behavior was observed

**Keywords**: ZnO, Fe-Doping, RTFM, Diluted Magnetic Semiconductor, Magnetic Properties.